

WHAT IS CLAIMED IS:

1. A composition comprising at least a first compound of the formula:



wherein R is optionally branched or straight chain, saturated or unsaturated C₈-C₂₀ alkyl, and a horticulturally acceptable vehicle, in an amount effective to prolong the freshness or the aesthetic appearance of a plant, a flower, a fruit or a plant cutting.

2. The composition of claim 1, wherein said compound has the formula:



wherein R is optionally branched or straight chain, saturated C₈-C₂₀ alkyl.

3. The composition of claim 2, wherein said compound is selected from the group consisting of NAE10:0, NAE 11:0, NAE12:0, NAE13:0, NAE14:0, NAE15:0, NAE16:0, NAE17:0, NAE18:0, NAE19:0, and NAE20:0.

4. The composition of claim 3, wherein said compound is selected from the group consisting of NAE10:0, NAE12:0, NAE14:0, NAE16:0, NAE18:0 and NAE 20:0.

5. The composition of claim 4, wherein said compound is NAE12:0 or NAE14:0.

6. The composition of claim 1, wherein said compound has the formula:



wherein R is optionally branched or straight chain, unsaturated C₈-C₂₀ alkyl.

7. The composition of claim 6, wherein said compound is selected from the group consisting of NAE10:1, NAE10:2, NAE10:3, NAE11:1, NAE11:2, NAE11:3, NAE12:1, NAE12:2, NAE12:3, NAE13:1, NAE13:2, NAE13:3, NAE14:1, NAE14:2, NAE14:3, NAE15:1, NAE15:2, NAE15:3, NAE16:1, NAE16:2, NAE16:3, NAE17:1, NAE17:2, NAE17:3, NAE18:1, NAE18:2, NAE18:3, NAE19:1, NAE19:2, NAE19:3, NAE20:1, NAE20:2, and NAE20:3.

8. The composition of claim 7, wherein said compound is NAE10:1, NAE10:2, NAE11:1, NAE11:2, NAE11:3, NAE12:1, NAE12:2, NAE12:3, NAE13:1, NAE13:2, NAE13:3, NAE14:1, NAE14:2, NAE14:3, NAE15:1, NAE15:2, NAE15:3, NAE16:1, NAE16:2, or NAE16:3.

9. The composition of claim 1, wherein said vehicle comprises at least a first nutrient source for said plant, flower, fruit, or plant cutting.

10. The composition claim 9, wherein said nutrient comprises a lipid, a carbohydrate, or an amino acid.

11. The composition of claim 10, wherein said carbohydrate is selected from the group consisting of lactose, dextrose, fructose, sucrose, glucose sorbitol, mannitol, and inositol.

12. The composition of claim 1, wherein said vehicle comprises at least a first surfactant.

13. The composition claim 12, wherein said surfactant is selected from the group consisting of polyoxyethylene sorbitan monolaurate, monopalmitate monostearate, ethoxylated alkyl phenols and a hydrogenated oil.

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14. The composition of claim 1, wherein said vehicle comprises at least a first buffer.

15. The composition of claim 14, wherein said buffer is selected from the group consisting of acetate, bicarbonate, citrate, succinate, malate, TRIS, MES, HEPES, MOPS, BES, and BIS-TRIS.

16. The composition of claim 1, wherein said vehicle comprises at least a first osmoregulant.

17. The composition of claim 16, wherein said osmoregulant is selected from the group consisting of a salt, a carbohydrate, a polyol, and a polyethylene glycol.

18. The composition of claim 1, further comprising at least a first plant hormone.

19. The composition of claim 18, wherein said plant hormone is selected from the group consisting of an auxin, a gibberellin and a cytokinin.

20. The composition of claim 1, further comprising at least a first antifungal, bacteriostatic, or bactericidal agent.

21. The composition of claim 20, wherein said bactericidal agent is selected from the group consisting of 8-hydroxyquinoline citrate, sodium dichloroisocyanurate, and 1,3-dichloro-5,5-dimethylhydantoin.

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22. The composition of claim 1, further comprising an alcohol.

23. The composition of claim 1, wherein said compound is NAE12:0, and wherein said composition further comprises a lecithin and a surfactant.

24. The composition of claim 1, further comprising at least a second anti-senescent component.

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25. The composition of claim 24, wherein said second anti-senescent component comprises: (a) a second distinct N-acylethanolamine compound selected from the group consisting of NAE10:0, NAE 11:0, NAE12:0, NAE13:0, NAE14:0, NAE15:0, NAE16:0, NAE17:0, NAE18:0, NAE19:0, NAE20:0, NAE10:1, NAE10:2, NAE10:3, NAE11:1, NAE11:2, NAE11:3, NAE12:1, NAE12:2, NAE12:3, NAE13:1, NAE13:2, NAE13:3, NAE14:1, NAE14:2, NAE14:3, NAE15:1, NAE15:2, NAE15:3, NAE16:1, NAE16:2, NAE16:3, NAE17:1, NAE17:2, NAE17:3, NAE18:1, NAE18:2, NAE18:3, NAE19:1, NAE19:2, NAE19:3, NAE20:1, NAE20:2, and NAE20:3; or (b) an anti-senescent component selected from the group consisting of Petalife®, Oasis®, Rogard®, Everbloom®, FloraLife®, Vita Flora®, Aquaplus®, Spring®, and Crystal Clear®.

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26. A kit comprising the composition of claim 1, and instructions for using said kit to delay the senescence of said plant, flower, fruit, or plant cutting.

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27. A method of delaying the senescence of a plant, flower, fruit, or plant cutting, said method comprising providing to said flower, fruit, or plant cutting a solution comprising a senescence-delaying amount of:

(a) a compound of the formula:



where R is optionally branched or straight chain, saturated or unsaturated C₈-C₂₀ alkyl; or

(b) the composition of claim 1.

28. The method of claim 27, wherein said providing comprises applying said solution to said plant, flower, fruit, or plant cutting.

29. The method of claim 28, wherein said applying comprises spraying, coating, soaking, storing or transporting said plant, flower, fruit, or plant cutting with said solution for a length of time effective to delay said senescence.

30. The method of claim 27, wherein said solution is applied to said plant, flower, fruit, or plant cutting under ambient temperature conditions.

31. The method of claim 27, wherein said solution is applied to said plant, flower, fruit, or plant cutting under temperature conditions of from about 4°C to about 15°C.

32. The method of claim 27, wherein said providing comprises administering said solution to the plant while under cultivation.

33. The method of claim 32, wherein said providing comprises directly administering said solution to the roots, leaves, or flowers of said plant.

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34. The method of claim 27, wherein delaying said senescence preserves or improves the appearance, fragrance, freshness, or aesthetic characteristics of said plant, flower, fruit, or plant cutting.

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35. The method of claim 27, wherein delaying said senescence reduces the droop, wilt, bloom loss, leaf loss, needle drop, or rate of dehydration of said plant, flower or plant cutting.

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36. The method of claim 27, wherein delaying said senescence prolongs or extends the appearance, taste, quality, or shelf life of said fruit.

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37. The method of claim 27, wherein said plant cutting is severed from said plant during or after cultivation of said plant.

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38. The method of claim 27, wherein said plant cutting comprises a bulb, a bloom, a bud, a flower, a petal, a stem, a branch, a rhizome, a bract, a fruit, a needle, or a leaf.

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39. The method of claim 27, wherein said plant is selected from the group consisting of roses, orchids, tulips, daffodils, hyacinths, carnations, chrysanthemums, baby's breath, daisies, gladiolus, agapanthus, anthuria, Protea, Heliconia, Strilizia, lilies,

asters, irises, delphiniums, liatris, lisianthus, statice, stephanotis, freesia, dendrobiums, sunflowers, snap dragons, and ornamental foliage.

5 40. The method of claim 39, wherein said ornamental foliage comprises cut leaves, stalks, stems, branches, limbs, or cut trees.

10 41. The method of claim 40, wherein said ornamental foliage comprises coniferous foliage.

15 42. The method of claim 41, wherein said ornamental foliage comprises juniper, fir, pine, cedar, or spruce foliage.

20 43. The method of claim 40, wherein said ornamental foliage comprises Christmas or holiday trees, wreaths, or garlands.

25 44. The method of claim 27, wherein the final concentration of said compound in said solution is between about 0.2 μM and about 800 μM .

30 45. The method of claim 44, wherein the final concentration of said compound in said solution is between about 0.4 μM and about 400 μM .

46. The method of claim 45, wherein the final concentration of said compound in said solution is between about 2 μM and about 200 μM .

47. The method of claim 46, wherein the final concentration of said compound in said solution is between about 4 μ M and about 100 μ M.

48. The method of claim 27, wherein said solution is provided to said plant, flower, fruit, or plant cutting, for a time of from about 10 minutes to about 28 days.

49. The method of claim 48, wherein said solution is provided to said plant, flower, fruit, or plant cutting, for a time of from about 30 minutes to about 21 days.

50. The method of claim 49, wherein said solution is provided to said plant, flower, fruit, or plant cutting, for a time of from about 1 hour to about 14 days.

51. An isolated polynucleotide that:

(a) encodes a polypeptide comprising an at least 11 contiguous amino acid sequence from SEQ ID NO:2;

(b) encodes a polypeptide having PLD activity and at least about 90% sequence identity with the amino acid sequence of SEQ ID NO:2;

(c) comprises an at least 15 contiguous nucleotide sequence from SEQ ID NO:1; or

(d) hybridizes to the sequence of SEQ ID NO:1, or that hybridizes to the complement thereof, under stringent hybridization conditions.

52. An isolated polynucleotide that comprises:

(a) a sequence region that consists of at least 15 contiguous nucleotides that have the same sequence as, or are complementary to, at least 15 contiguous nucleotides of SEQ ID NO:1; or

(b) a sequence region of from 200 to about 10,000 nucleotides in length that hybridizes to the nucleic acid segment of SEQ ID NO:1; or that hybridizes to the complement thereof, under hybridization conditions comprising a salt concentration of from about 0.04 M to about 0.10 M, and a temperature of from about 60°C to about 75°C.

53. The polynucleotide of claim 51, operably linked to a heterologous, plant-expressible promoter.

54. The polynucleotide of claim 51, comprised within a vector.

55. The polynucleotide of claim 51, comprised within a transformed plant host cell.

56. An isolated polypeptide encoded by the polynucleotide of claim 53.

57. A transgenic plant comprising a heterologous nucleic acid segment that comprises the polynucleotide of claim 51.

58. A progeny, seed, or plant grown from said seed, of any generation of the transgenic plant of claim 57.

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